

METHOD FOR MAKING A SEMICONDUCTOR
DEVICE HAVING A LOW-K DIELECTRIC LAYER

This application is a DIV of 09/524,766 03/14/2000 PAT 6,362,091.
FIELD OF THE INVENTION

5 The present invention relates to semiconductor devices having a low-k dielectric layer and a method for making such devices.

BACKGROUND OF THE INVENTION

10 Semiconductor devices include metal layers that are insulated from each other by dielectric layers. As device features shrink, reducing the distance between the metal layers, capacitance increases. To address this problem, insulating materials that have a relatively low dielectric constant (herein referred to as low-k dielectrics) are being used in place of silicon dioxide (and other materials that have a relatively high dielectric constant) to form the dielectric layer that separates the metal lines.

15 A material that may be used to form such a low-k dielectric layer is carbon doped oxide, which can be deposited using standard PECVD equipment. (Coping applications, serial nos. 09/422,841 and 09/465,654, filed October 21, 1999 and December 17, 1999 respectively, each assigned to this application's assignee, describe semiconductor devices that include a carbon
20 doped oxide dielectric layer.) Using this material instead of silicon dioxide to separate metal lines may yield a device having reduced propagation delay, cross-talk noise and power dissipation. Although carbon doped oxide is a promising low-k substitute for silicon dioxide, films formed from this material may be relatively brittle. As a consequence, such films' crack resistance may be